

Caltech Scintillator Measurements

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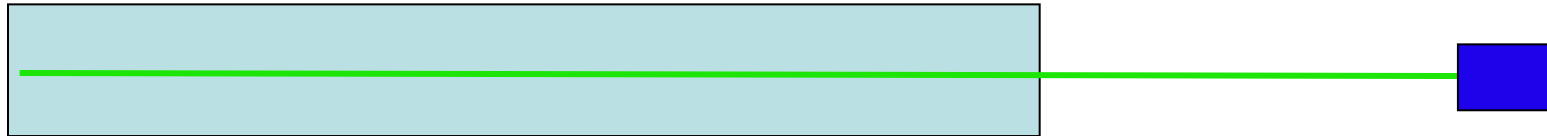
May 15, 2004

Getting Started...

- Work mostly done by Jason Trevor
- We now have on hand at Caltech:
 - 1 barrel Bicron 517L scintillator (10% pseudocumene)
 - ~800 m 0.8 mm diameter Kuraray WLS fiber
 - ~1600 m 0.6 mm diameter Kuraray WLS fiber
 - We can provide some of this fiber for measurement needs elsewhere
- Some first light output measurements
 - Oil-filled tubes compared to MINOS strips
 - Water-filled tubes with plastic scintillator...!?
- Plans for aging measurements plus

Setup for light output measurements

3 cm thick x 4 cm wide (inside) x 1 m aluminum tube
Painted on the inside with lots of Bicorn TiO_2 paint



Filled with Bicorn 517L scintillator or with water with a piece of MINOS scintillator with the outer coating machined off.

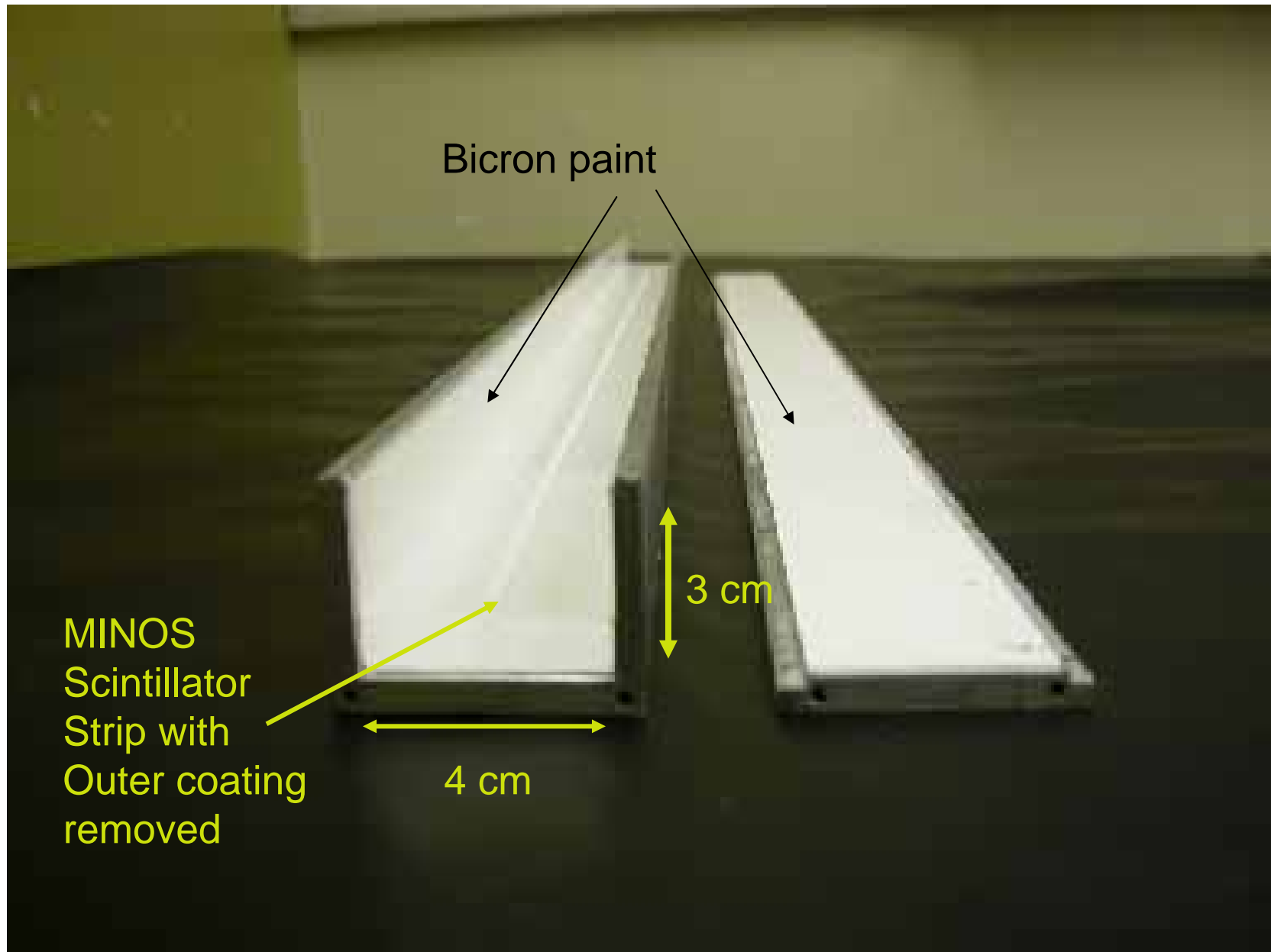
Single fiber (cut and blackened at the far end)
and U-fiber readout to M16 PMT (of uncertain
absolute quantum efficiency). Thus far, measurements have
been with MINOS 1.2 mm diameter fiber.

2 m WLS fiber extension between the tube and PMT

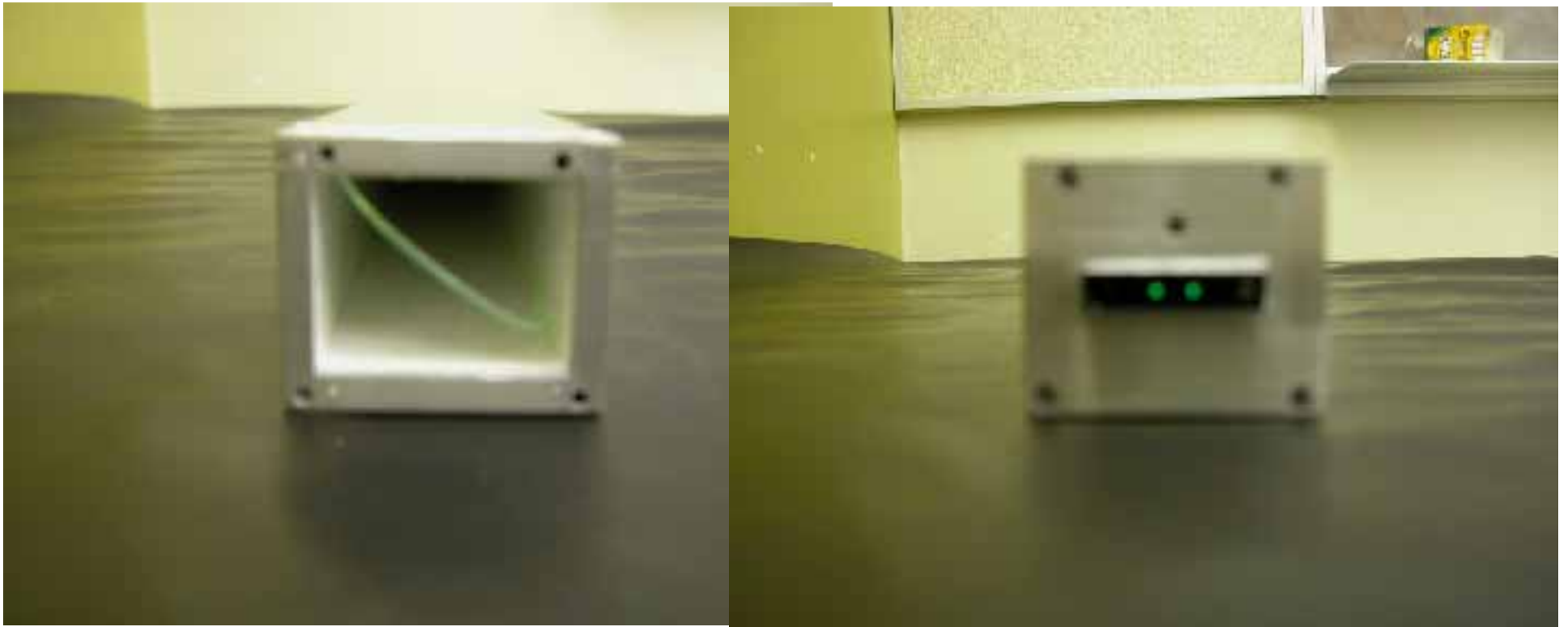
All measurements normalized to a “MINOS Strip”

~Vertical cosmic rays used to measure light output

The painted tube



Tube with U Fiber



Light output measurements

- “MINOS Strip” (single glued fiber) 1.0
- MINOS strip in water, single fiber 0.83
- MINOS strip in water, U-fiber 2.9
- 517L with single fiber 2.2
- 517L with U Fiber
 - Test 1, fiber broken after opening 4.5
 - Test 2, fiber very crazed after opening 4.9
 - Note, we have tested many 1.2 mm fibers curved through 5 cm diameter in water with no noticeable damage. Bicorn 517L is doing *something* to these fibers.
 - We will soon do tests with smaller diameter fibers

Aging Tests Plan

- We plan to setup a “large scale” aging test facility:
 - Multiple loops of fiber in oil-filled scintillator tubes
 - Multiple tests of curving and installing fibers
 - High temperature aging
 - Temperature cycle aging
 - Fibers in water?
 - More light output tests (with APD?)